

APPENDIX

Changes to Specification:

↳ The following is a marked-up version of the amended paragraphs:

[0008] FIG. 1 is a figure of a brake system which shows the brake device according to one embodiment of this invention.

~~FIG. 1A is an enlarged view of the master cylinder and booster of FIG. 1.~~

FIG. 2 is an explanatory figure which shows the pressure control valve contained in the above brake device.

FIG. 3 is a block diagram of the fluid pressure control device of the above brake device.

FIG. 4 shows the relation between the master pressure controlled by the fluid pressure control device contained in the above brake device, and the assistance power (the target pressure difference).

FIG. 5 is a flow chart which shows the multi-mode failure detection routine that is stored in the ROM of the above fluid pressure control device.

FIG. 6 is a figure which shows the relations between the brake operating power and the master pressure in the above brake device.

FIG. 7 is a flow chart which shows the failure related brake pressure control routine that is stored in the ROM of the above fluid pressure control device.

FIG. 8 is a flow chart which shows the normal brake pressure control routine stored in the ROM of the above fluid pressure control device.

FIG. 9 shows the relation between the operation power and the master pressure of the brake pedal in the above brake device.

FIG. 10 shows the operation power and the condition of the change in the master pressure when large amount of fluid leakage failure is detected in the above brake device, respectively.

FIG. 11 shows the operation power and the condition of the change in the master pressure when a small amount fluid leak failure is detected in the above brake device, respectively.

FIG. 12 shows the operation power and the stroke, the booster pressure and the condition of the change in each fluid pressure of two pressure chambers of the master cylinder when the bottoming condition occurred in the above brake device, respectively.

FIG. 13 shows the master pressure and the changing condition of the operation power in the above brake device when the servo function failure occurred during the brake operation.

FIG. 14 is a flow chart which shows the multi-mode failure detection routine that is stored in the ROM of the fluid pressure control device contained in the brake device in another embodiment of this invention.

[0010] A brake pedal 10, which functions as a brake operating member, is connected to a master cylinder 14 through a vacuum booster (hereafter abbreviated to "booster") 12 in FIG. 1. The master cylinder 14 is of the tandem type, in which two pressure pistons ~~14a and 14b~~engaged with each other in series can slide, and two pressure chambers ~~14e and 14d~~are formed by each other independently in the housing in the front of each pressure piston. The master cylinder 14 generates an equal fluid pressure in each of the pressure chambers mechanically, corresponding to the brake operating power which is the pedal power of the brake pedal 10. The brake device in this embodiment is a two system-type brake.

[0045] In this embodiment, the first predetermined operation power F0 is decided based on, for example, the set load of the return spring ~~15a, 15b~~which is contained in the

booster 12 and the master cylinder 14, etc. When the brake device is in the normal condition, the first predetermined fluid pressure P_{th1} is made a smaller value than the master pressure at the time that the operation power is the first predetermined operation power F_0 . The normal condition includes the case that a small amount of fluid leakage is occurring.

[0046] When the booster 12 is in the normal condition, the brake operating power and the assistance power of the booster 12 are added to the output member 11 (see FIG 1A) in the booster 12, and the output of the output member 11 is added to the pressure piston 14b in the master cylinder 14. In the booster 12, if the brake operating power added to the input member 13 through the brake pedal 10 becomes larger than the power based on the set load of the return spring 15b of the input member 13, the input member is moved against the power of the return spring, the control valve is placed in the operating condition, and the power piston generates the assistance power. In the master cylinder 14, if the output power added to the pressure piston 14b becomes bigger than the power based on the set load of the return spring of the master cylinder 14, the pressure piston is moved against the power of the return spring 15b, and the fluid pressure is generated in the pressure chamber.
which (2) were discussed in Example 10
which (2) were discussed

[0051] The bottoming condition is the condition in which, in the master cylinder 14, (1) the front pressure piston 14a of the two pressure pistons is contacted to the stopper 19 of the master cylinder 14 (it also may be the bottom part of the master cylinder), (2) the rear pressure piston 14b is contacted to the front pressure piston 14a, or (3) both conditions (1) and (2) occur (the front pressure piston 14a is contacted to the master cylinder and the rear pressure piston 14b is contacted to the front piston 14a).

Changes to Claims:

Claims 22-30 are added.

The following is a marked-up version of the amended claims:

1. (Twice Amended) A brake device having a fluid pressure source which generates a fluid pressure based on operation of a brake operating member, the brake device actuated by the fluid pressure generated by the fluid pressure source, comprising:

a brake operating amount detector which detects an operating amount of the brake operating member,

a fluid source pressure detector which detects the pressure generated in the fluid pressure source, and

a failure detector which detects and distinguishes between different types of failures of the brake device based on the pressure detected by the fluid source pressure detector and the operating amount detected by the brake operating amount detector, wherein the failure detector detects and distinguishes the types of the failures between: (i) a case in which the pressure detected by the fluid source pressure detector at a time when the detected operating amount is a first predetermined amount of operation which is smaller than a second predetermined amount of operation is smaller than a first predetermined pressure which is larger than a second predetermined pressure, (ii) a case in which the pressure detected by the fluid source pressure detector at the time when the detected operating amount is the first predetermined amount of operation is larger than the first predetermined pressure, and (iii) a case in which the pressure detected by the fluid source pressure detector at a time when the operating amount detected by the brake operation amount detector is the second predetermined amount of operation is larger than the second predetermined pressure.

3. (Twice Amended) The brake device as in claim 1, wherein the fluid pressure source includes a master cylinder which generates the fluid pressure corresponding to an input power, and a booster which increases an operation power of the brake operating member and outputs an increased operation power to the master cylinder,

the fluid source pressure detector includes a master cylinder pressure detector which detects the pressure of the master cylinder or a connected portion of the master cylinder, and

the failure detector detects a failure of the booster ~~if the pressure in the case that the pressure of the master cylinder at the time when the amount of the brake operation the opening amount of the brake operation detected by the operating amount detector is the~~ second predetermined amount of operation is larger than the second predetermined pressure, and detects the failure of fluid leakage of the brake device ~~if the pressure in a case that the pressure of the master cylinder at the time when the amount of the brake operation is the~~ second predetermined amount of operation is smaller than the second predetermined pressure.

5. (Twice Amended) The brake device as in claim 4, wherein the brake operating amount detector includes an operation power detector which detects power supplied to the brake operating member, and

the bottoming detector detects the bottoming condition based on whether an increasing gradient of the operation power detected by the brake operating amount detector is larger than a predetermined gradient or not.

6. (Twice Amended) The brake device as in claim 5, further comprising a brake fluid control device which controls a brake fluid pressure in different ways based on the type of the failure detected by the failure detector,

the fluid source pressure detector includes a master cylinder pressure detector which detects a master pressure of the master cylinder or a connected portion of the master cylinder,

the failure detector detects a small amount fluid leakage failure ~~if the master in the case that the pressure detected by the master cylinder pressure detector at the time when the brake operation detected by the brake operating amount detector is the first predetermined~~

operation is larger than the first predetermined pressure, and a decreasing gradient of the master pressure detected by the master cylinder pressure detector is larger than a predetermined gradient,

the brake fluid control device includes a leak amount control device which increases a supplying amount of a brake fluid to a brake, if the failure detector detects the small amount fluid leakage failure, compared to the supplying amount of the brake fluid when a large amount fluid leakage failure is detected.

8. (Twice Amended) The brake device as in claim 1, further comprising a brake fluid control device which controls a brake fluid pressure in different ways based on the type of the failure detected by the failure detector,

the fluid pressure source includes a master cylinder which has a pressure chamber and generates the fluid pressure corresponding to an input power, a first compressing device which compresses an operating fluid of the pressure chamber of the master cylinder and supplies a compressed operating fluid to a brake, a second compressing device which compresses the operating fluid stored in an atmospheric condition in a reservoir ~~tank~~chamber, the reservoir ~~tank~~chamber is larger than the pressure chamber of the master cylinder, and

the brake fluid control device includes a brake condition selection device which selects either of a first condition in which the brake is compressed by the first compressing device, or a second condition in which the brake is compressed by the second compressing device based on the type of the failure detected by the failure detector.

9. (Twice Amended) A brake device having a fluid pressure source which generates a fluid pressure based on operation of a brake operating member, the brake device actuated by the fluid pressure generated by the fluid pressure source, comprising:

a brake operating amount detector which detects an operating amount of the brake operating member,

a fluid source pressure detector which detects the fluid pressure generated in the fluid pressure source,

a failure detector which detects and distinguishes between different types of failures of the brake device based on the pressure detected by the fluid source pressure detector and the operating amount detected by the brake operating amount detector, and

a brake fluid control device which controls the brake fluid pressure in different ways based on the type of the failure detected by the failure detector, wherein the fluid pressure source includes a master cylinder which has a pressure chamber and generates the fluid pressure corresponding to an input power, a first compressing device which compresses an operating fluid of the pressure chamber of the master cylinder and supplies a compressed operating fluid to a brake, a second compressing device which compresses the operating fluid stored in an atmospheric condition in a reservoir ~~tank~~chamber, the reservoir ~~tank~~chamber is larger than the pressure chamber of the master cylinder, and

the brake fluid control device includes a brake condition selection device which selects either of a first condition in which the brake is compressed by the first compressing device, or a second condition in which the brake is compressed by the second compressing device based on the type of the failure detected by the failure detector.